REMARKS

Applicant respectfully requests the Examiner's consideration of the present application as amended. Applicant submits that this amendment responds to an argument or suggestion that was first presented in the Final Office Action date April 13, 2004. Applicant submits the amendment either implements the Examiner's suggestion with respect to rejected claims or otherwise overcomes the few remaining outstanding rejections.

Applicant thus submits that there is a good and sufficient reason why this amendment is necessary, why this amendment was not earlier presented, and why this amendment should be admitted now. Applicant believes that consideration of this amendment could lead to favorable action that would remove one or more issues for appeal.

Summary of Office Action

Claims 1-5, 7, 9-18 and 20 are pending.

Claims 1-3, 5, 7, and 11 are allowed.

Claims 4, 9, 10, 12-18, and 20 were rejected.

Claim 10 was rejected under 35 U.S.C. § 112 first paragraph.

Claims 4 and 9 were rejected under 35 U.S.C. § 112 second paragraph.

Claims 12, 14, and 18 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,568,063 of Takekuma ("Takekuma") in view of U.S. Patent No 5,382,841 of Feldbaumer ("Feldbaumer") and U.S. Patent No. 6,297,663 of Matsuoka ("Matsuoka").

Claim 13 was rejected under 35 U.S.C. § 103 as being unpatentable over Takekuma, Feldbaumer, and U.S. Patent No. 4,445,048 of Graham ("Graham").

Claims 15 and 16 were rejected under 35 U.S.C. § 103 as being unpatentable over Takekuma, Felbaumer, Graham, and U.S. Patent No. 5,564,024 of Pemberton ("Pemberton").

Claim 17 is rejected under 35 U.S.C. § 103 as being unpatentable over Takekuma, Feldbaumer, and U.S. Patent No. 6,011,710 of Wiggers ("Wiggers").

Claim 20 was rejected under 35 U.S.C. § 103 as being unpatentable over Takekuma, Feldbaumer, and U.S. Patent No. 5,572,685 of Fisher, et al. ("Fisher").

Response to 35 U.S.C. § 112, first paragraph

Claim 10 was rejected under 35 U.S.C. § 112, first paragraph. The Examiner stated that the specification was "enabling for achieving sufficient isolation by active circuitry instead of passive components" but

> does not reasonably provide enablement for achieving sufficient isolation by passive components (i.e., RD) and active circuitry (i.e., together...) The Examiner doubts why the claimed invention needs 'passive components' and 'active circuitry' for achieving sufficient isolation because the specification states 'alternatively, active circuitry such as transistors and operational amplifiers may be used instead of passive components to achieve isolation...'

(04/13/2004 Final Office Action, p. 2)

In view of the comments the Examiner has made with respect to claim 10 and subsequently with respect to claim 9, applicant believes that the Examiner has mistakenly limited the scope of the term "impedance". Clarification of this issue should resolve a number of points raised in the Examiner's Final Office Action.

In a subsequent portion of the Final Office Action, the Examiner has misquoted or at least take out of context a portion of the specification in support of his argument. In particular, the Examiner has stated:

> In fact, the Applicants define RD as an inline resistor (See Application, page 2, lines 20-22). However, the Applicants recite the broader limitation "the isolation circuitry comprises passive components" in the claim 9 since the subject matter "passive components" could be interpreted as an LC circuitry in addition to the resistor circuitry.

(04/13/2004 Final Office Action, p. 3)

Applicant agrees that "passive components" can include components other than resistors. However, applicant submits that the passive component limitation *is* narrower because the term "impedance" alone does not limit the parent claim to exclusively active or passive circuitry nor does it exclude combinations of active and passive isolation circuitry.

Furthermore, the language of claim 1 does not limit the claimed isolation circuitry to a passive component comprising a single inline resistor of value RD. The Examiner is referred again to the very portion of the specification that he cited along with the surrounding text as follows:

> *The backplane further includes isolation circuitry for electrically coupling each of the plurality of signal lines of the common bus to an electronic device through the isolation circuitry.* In one embodiment, the electronic device is removably attached to the backplane signal lines through a connector. *In one embodiment, the isolation circuitry includes an inline resistor, RD, coupling at least one signal line from the common bus to the electronic device.* The isolation circuitry association with some signal lines may further comprise pull up resistors.

(Specification, p. 2, lines 16-23)(*emphasis added*)

Applicant notes that this is the "Summary" which inherently omits details and all the variations discussed in the remainder of the specification. Nonetheless, even the Summary clearly states "*in one embodiment*" which hardly supports the Examiner's position that the only embodiment possible for RD is a passive component resistor. Applicant's subsequent discussion of the use of active circuitry (Specification, p. 11, lines 25-27; Fig. 2 also original and current claims 3, 9, and 10 compared with original and current claim 1 under the doctrine of claim differentiation) and use of phrases "in one

embodiment", "in this embodiment" in the specification (Specification, p. 2, line 20; p. 6, line 12) bolsters applicant's position rather than the Examiner's with respect to claim 1.

Applicant respectfully submits that the specification is sufficiently enabling to support active or passive isolation circuitry that maintains the claimed impedance RD such that (RA+RD)≥3.3KΩ and RD≤25KΩ. In particular, applicant respectfully submits that there is sufficient enablement for the language of claim 1 as follows:

> 1. A backplane apparatus comprising:
> a common bus comprising a plurality of signal lines, each signal line of the common bus having a current limiting element of impedance RA d.c. coupled to a first supply level; and
> *isolation circuitry* for electrically coupling each of the plurality of signal lines of the common bus to a corresponding plurality of signal lines of an electronic device to enable communication between the common bus and the electronic device through the isolation circuitry, *the isolation circuitry having an impedance RD*, wherein (RA+RD)≥3.3KΩ, wherein RD≤25KΩ.

(Claim 1)(*emphasis added*)

Any claim that further limits claim 1 is a proper dependent claim. Thus subsequent limitations requiring the isolation circuitry to include active components in dependent claim 10 as follows:

> 10. The apparatus of claim 1 wherein *the isolation circuitry comprises active components.*

(Claim 10)(*emphasis added*)

are fully supported and enabled by the specification.

Thus applicant respectfully submits claim 10 is enabled in accordance with 35 U.S.C. § 112, first paragraph. Applicant respectfully submits that the 35 U.S.C. § 112, first paragraph rejection has been overcome.

Response to 35 U.S.C. § 112, second paragraph

Claims 4 and 9 were rejected under 35 U.S.C. § 112, second paragraph. With respect to claim 4, the Examiner has indicated that the term "approximately" renders the claim indefinite because no one could define the values of "approximately 1KΩ to 25KΩ".

Applicant respectfully submits that the use of "approximately" is commonplace with respect to defining ranges. MPEP 2173.05(c) notes that the use of specific numerical ranges in a claim does not ordinarily raise an issue of whether the claim is definite. Claim 4 is a *dependent* claim rather than an independent claim. Applicant notes that the range identified in claim 4 necessarily is a subset of the range defined in claim 1. *Applicant respectfully submits that in view of a) the range already defined in claim 1, and b) the range of RD in claim 4 is narrower than the range defined in claim 1, the range of claim 4 should not be rejected under 35 U.S.C. § 112, second paragraph for indefiniteness (see MPEP 2173.05(c) part 1).*

With respect to claim 9, applicant has presented these arguments with respect to the rejection of claim 10 above. The Examiner has apparently mistakenly limited the definition of the term "impedance" and either misquoted or taken a portion of the specification out of context to support his position.

Applicant agrees that "passive components" can include components other than resistors. Contrary to the Examiner's interpretation, however, parent claim 1 does not limit the isolation circuitry to passive or active circuitry but does place constraints on the values for RA and RD. The passive component limitation of claim 9 necessarily narrows claim 1 because the term "impedance" alone does not limit parent claim 1 to active or passive nor does

it exclude combinations of active and passive isolation circuitry. Even the Examiner's reference to the "Summary" (which inherently omits details and all the variations discussed in the remainder of the specification) clearly indicated that an inline resistor RD was *one* embodiment.)

Claim 9adds the limitation that the isolation circuitry includes passive components. Claim 9 is a proper dependent claim because it adds further structure and limitations to claim 1. Claim 9 is thus narrower than claim 1.

Given that claim 9 was apparently rejected based on a non-existent limitation imposed by the Examiner in claim 1 applicant respectfully submits that the rejection of claim 9 for the reasons stated by the Examiner have been overcome.

Applicant respectfully submits the rejections of claims 4 and 9 under 35 U.S.C § 112, second paragraph have been overcome.

Response to 35 U.S.C. § 103 rejections

Claims 12-18 and 20 were rejected under 35 U.S.C. § 103 over Takekuma, Feldbaumer, and Matsuoka with various combinations of Graham, Pemberton, Wiggers, and Fisher. In order to sustain a rejection under 35 U.S.C. § 103, three criteria must be met:

> *First*, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *Second*, there must be a reasonable expectation of success. *Finally*, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure

(*In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991)(*emphasis added*)

Matsuoka has been cited merely for extending the combination of Feldbaumer and Takekuma from one signal line to a plurality of signal lines.

Takekuma is relied upon by the Examiner for a number of elements, particularly the first current limiting element d.c. coupled to a first supply level and the isolation circuitry. The Examiner notes that Takekuma does not disclose and has relied upon Feldbaumer for disclosing: a switching circuit selectively coupling a second terminal of the associated first current limiting element to a second supply level to select a logic level of the associated signal line. (4/13/2004 Final Office Action, p. 4).

In particular, the Examiner has stated:

> Feldbaumer discloses a switchable active bus termination circuit (Fig. 1), wherein said bus termination circuit comprising switching circuitry (i.e., switching circuit 18 of Fig. 1) for signal line of a common bus (i.e., electrical conductor 21 of Fig. 1), wherein said switching circuitry selectively couples a second terminal (i.e., connection point on terminal resistor 20 for switching circuit 18 in Fig. 1) of an associated first current limiting element (i.e., resistor 20 of Fig. 1) to a second supply level to select a logic level of said associated signal line (See col. 2, lines 54-65).

(4/13/04 Final Office Action, p. 4)

Applicant respectfully traverses the Examiner's characterization of Feldbaumer.

Electrical busses are susceptible to reflections of the logic signals along the transmission line unless properly terminated with an impedance equal to the characteristic impedance of the electrical bus (Feldbaumer, col. 1, lines 21-23). Most SCSI systems use a terminating resistor array in a single in-line package (SIP) that can be plugged into a socket of the terminating peripheral device. If the peripheral device is not the last device on the bus, the resistor SIP must be removed. The manual operation of inserting and removing the resistor SIP in the peripheral device is inconvenient and often confusing. (Feldbaumer, col. 1, lines 53-63).

Feldbaumer subsequently discloses selectable active termination of a signal line so that manual insertion/removal of a resistor SIP can be avoided. In particular, the bus may be terminated through the use of a control signal ($\overline{\text{ENABLE}}$) to enable the termination circuitry instead of performing a manual insertion or removal of a resistor SIP.

Contrary to the Examiner's assertions, Feldbaumenr's switching circuit 18 is not used to change the logic levels of signal line 21. Communicating logic signals is independent from termination of the signal line. Indeed, given that only the *last* device is terminated, this beg the question as to how any other device could then change the signal line logic level or what the purpose of element 22 is. *Switch 18 is used to enable or disable active termination of the signal line - not to change the bus logic levels.* (see, Feldbaumer, col. 4, lines 1-22).

When termination is disabled, element 20 has one connection point "floating". When $\overline{\text{ENABLE}}$ is asserted, the previously floating terminal of element 20 is connected to voltage regulator 12. (Feldbaumer, Fig. 1). After appropriately trimming the trimmable resistors 32, 40, and 46, the signal line 21 may be selectively terminated at approximately a 110Ω impedance using the $\overline{\text{ENABLE}}$ control signal. (Feldbaumer, col. 3, lines 5-16, 44-58, col. 4, lines 1-22)

Even if one accepted the Examiner's arguments, applicant respectfully submits that it is not clear how the Examiner has proposed combining Takekuma and Feldbaumer in a workable manner consistent with the teachings of both. For example, is the Examiner proposing substitution of Feldbaumer's active termination circuitry for one or both of the termination resistors 50, 51 of Takekuma ? At best, applicant submits that this might result in selectable active termination of both ends of Takekuma's bus - but

enabling termination does not switch the logic levels or convey a logic signal on the bus.

Moreover, it is not clear how the Examiner is coupling a first terminal of Takekuma's/Feldbaumer's current limiting element to a first supply level while using the termination circuitry of Feldbaumer to switch a second terminal of the current limiting element to a second supply level. *Applicant respectfully requests the Examiner to please illustrate the combination proposed by the Examiner and indicate the source (i.e., Feldbaumer, Takekuma, etc.) of the elements.*

Applicant respectfully submits that the combination of Takekuma, Feldbaumer and Matsuoka proposed by the Examiner does not teach or suggest *each signal line having a first terminal of an associated first current limiting device d.c. coupled to a first supply level* and *switching circuitry for each signal line of the common bus, wherein the switching circuitry selectively couples a second terminal of the associated first current limiting element to a second supply level to select a logic level of the associated signal line* with *isolation circuitry electrically coupling each signal line to a plurality of electronic devices.*

In contrast, claim 12 includes the language:

> 12. A backplane apparatus comprising:
> a common bus comprising a plurality of signal lines, *each signal line having first terminal of an associated first current limiting element d.c. coupled to a first supply level,* the first current limiting element of impedance RA;
> *isolation circuitry electrically coupling each of the plurality of signal lines of the common bus to a plurality of electronic devices,* each device having a corresponding plurality of signal lines to enable communication of signals between the common bus and the plurality of electronic devices; and
> *switching circuitry for each signal line of the common bus, wherein each switching circuitry selectively couples a second terminal of the associated first current limiting element to a second supply level to select a logic level of the associated signal line.*

(Claim 12)(*emphasis added*)

Applicant respectfully submits that the remaining rejections under 35 U.S.C. § 103 were based on additional combinations with Graham, Pemberton, Wiggers, and Fisher. These remaining rejections were presented only with respect to dependent claims. None of these additional references, however, makes up for the deficiencies of Takekuma and Feldbaumer. In view of the arguments presented above, applicant submits claim 12 is patentable in view of all of the cited references.

Given that claims 13-18 and 20 depend from claim 12, applicant respectfully submits claims 13-18 and 20 are likewise patentable under 35 U.S.C. § 103 in view of the cited references.

Applicant respectfully submits that the rejections under 35 U.S.C. § 103 have been overcome.

Conclusion

In view of the amendments and arguments presented above, applicant respectfully submits the applicable rejections and objections have been overcome. Claims 1-5, 7, 9-18 and 20 are pending. Claims 1-3, 5, 7, and 11 have already been allowed. In view of the arguments presented above, applicant submits claims 4, 9, 10, 12-18, and 20 should also be found to be in condition for allowance.

If there are any issues that can be resolved by telephone conference, the Examiner is respectfully requested to contact the undersigned at **(512) 306-9470**.

Respectfully submitted,

Date June 14, 2004 William D. Davis

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